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ADDITIONS TO THE BRYOPHYTE FLORA OF
KEWEENAW COUNTY, MICHIGANF. J. HERMANN¹

The Keweenaw Peninsula, on Lake Superior in northernmost Michigan, became botanically renowned with the publication in 1935 of Fernald's paper, *Critical Plants of the Upper Great Lakes Region of Ontario and Michigan* (2). In this paper Professor Fernald discussed at length an impressive assemblage of species among the vascular plants, known principally from the Rocky Mountains and the Pacific coast but occurring also in isolated colonies on the Keweenaw Peninsula and a few other restricted areas, possibly unglaciated during the Pleistocene, far east of their principal range.

In 1937 and 1938 Dr. W. C. Steere published noteworthy papers on the bryophytes of the Keweenaw Peninsula (10, 11) in which he pointed out that many of the mosses and hepatics occurring on the Peninsula paralleled the disjunct distribution of the Cordilleran, Pacific coast and arctic vascular plants enumerated by Fernald. Western and arctic

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elements in the flora of Isle Royale (which is also part of Keweenaw County) have likewise been known as a result of Ruthven's ecological survey (7) and of a fairly recent survey of the bryophytes of the island (13), in which account was taken of earlier reports by Holt (6) and Cooper (1).

That the bryophyte flora of Keweenaw is still incompletely known, however, was pointed out by Steere and was attested by the results of a few days' collecting by the writer around Copper Harbor, on the peninsula, and Rock Harbor, on the island, during August 1960. Because the bryophytes of Michigan as a whole (12), and of the Isle Royale and the Keweenaw Peninsula in particular, are comparatively well-documented it seems worth while to record here the few additions (which include three genera new to the State) to the known flora that turned up in 1960.

The writer is grateful to Howard Crum and Margaret Fulford for help in the identification of critical species, and to A. LeRoy Andrews he is indebted for determination of the *Sphagnum* and *Bryum*. Robert R. Ireland kindly gave permission to include the record of his collection of *Trichodon cylindricus* made in 1961.

Species new to the flora of Michigan, based on Steere, 1947 (12), are indicated in the following list with an asterisk. All of the species listed, with the exception of *Andreaea rupestris*, are new to either the Keweenaw Peninsula or Isle Royale according to the most recent reports (12, 13). Specimens have been deposited in the U. S. National Herbarium, Washington, D. C. and duplicates in the herbarium of either the University of Michigan, Ann Arbor or Michigan State University, East Lansing, and the National Herbarium of Canada.

KEWEENAW PENINSULA

Lophozia quadriloba (Lindl.) Evans. On conglomerate shore of Lake Superior at edge of woods, Copper Harbor, 16354. Although this species is not included in the most recent list (12) of Michigan bryophytes, it has been subsequently reported from Copper Harbor by Schuster (8) in his account of Minnesota hepatics.

Andreaea rupestris Hedw. On granitic outcrop, Mt. Bohemia, just west of Lac La Belle, 16218. This moss is not new to either the Keweenaw Peninsula or Isle Royale but additional records are noted here because of its rarity in the State. As pointed out by Steere (10) it has previously been known in Michigan from only a single locality on Isle Royale and from one each in Keweenaw and Marquette Counties.

Encalypta procera Bruch. Abundant on conglomerate bluff at edge of woods along Mandan Road (US 41), 1 mile south of Copper Harbor, 16236. (Determination verified by Seville Flowers). The geographical distribution of this species is given by Flowers (3) as "Alaska to Montana, Idaho and Washington. Common in British Columbia. Also in Ontario, Greenland, Northern Europe and Asia." It was reported from Isle Royale by Cooper (1), however, in 1913.

Heterocladium squarrulosum (Voit) Lindb. Base of gneiss outcrop near shore of Lake Superior, Copper Harbor, 16151; moist conglomerate slope, gorge of Manganese River, ½ mile south of Copper Harbor, 16163. Apparently the only previous Michigan record for this species is from the Porcupine Mountains, Ontonagon County.

**Oreoweisia serrulata* (Funck) De Not. On moss-covered crest of conglomerate shore of Lake Superior, Devil's Washtub, 1½ miles west of Copper Harbor, 16133; crevice in conglomerate shore of Lake Superior, Fort Wilkins, Copper Harbor, 16225. Also occurring on Isle Royale as noted below. Although Grout (5) refers to this moss as being a rare plant in North America (and a calciphile), unlike most of the other Keweenaw novelties it is not predominantly western or arctic in its distribution but is known also from eastern North America and in the mountains as far south as Tennessee and Kentucky.

Orthotrichum sordidum Lesq. & James. On trunk of sugar maple in woods near Lake Manganese, 1 mile south of Copper Harbor, 16101; on trunk of ash, Silver Creek, 4½ miles east of Eagle Harbor, 16138.

**Trichodon cylindricus* (Hedw.) Schimp. (*Ditrichum cylindricum* (Hedw.) Grout). On soil along road up Mt. Bohemia, alt. 867 ft., just west of Lac La Belle, *R. R. Ireland, Jr. 5364*, Aug. 21, 1961 (US). This is another farwestern species which is evidently a glacial relic in Michigan. Grout (5) gives its range as "western North America, Yukon to Montana, Nevada and Washington."

**Trichostomum tenuirostre* (Hook. & Tayl.) Lindb. (*T. cylindricum* (Bruch) C. Muell.) Moist crevices in conglomerate shore of Lake Superior, Fort Wilkins, Copper Harbor, 16118. An earlier, but evidently unreported collection, from Keweenaw County by W. C. Steere and A. J. Sharp was recently noted in the University of Michigan Herbarium by Mrs. Jennie Dieterle and called to the writer's attention. It was collected on Mt. Bohemia, September 1, 1937. Like *Oreoweisia* this is a species of widespread distribution, occurring as far south as the mountains of North Carolina and Arizona.

ISLE ROYALE

Cephaloziella striatula (Jens.) Douin. With *Lophozia ventricosa* on vertical face of saturated tussock of *Scirpus caespitosus* in rock pool, Scoville Point, 16325½. Not recorded from Michigan in Steere's list (12), and ascribed only to Greenland, Alaska, British Columbia and Europe by Frye and Clark (4), but Schuster (8) reports the species (as *C. subdentata* Warnst.) from Minnesota, Michigan (Cheboygan County), Maine, New Hampshire and New York.

Scapania paludicola Loeske & K. Muell. In bed of *Empetrum* at edge of rock pool, Scoville Point, 16328½.

Amblystegium serpens (Hedw.) BSG. On conglomerate near shore of Rock Harbor, 16261.

Andreaea rupestris Hedw. On vertical face of basalt boulder along trail to Scoville Point, 16325; on basalt boulder along trail to Hidden Lake, 16333. Previously known on Isle Royale only from Passage Island (13).

Anomodon attenuatus (Hedw.) Hüben. In shallow cave below Monument Rock, 16345½. It seems remarkable that no species of this usually very common genus has previously been reported from the island.

Bryum cuspidatum (BSG.) Schimp. Crevice in trap rock shore of Rock Harbor, 16281. A questioned report of *B. affine* (Bruch.) Lindb. in Thorpe and Povah's list (13) might be referable to *B. cuspidatum*.

Calliergon giganteum (Schimp.) Kindb. On *Thuja* log near Hidden Lake, 16335.

Cynodontium schistii (Wahl.) Lindb. On vertical face of boulder in shade, Monument Rock, 16349.

Dichodontium pellucidum (Hedw.) Schimp. Crevice in trap rock shore of Rock Harbor, 16275.

Grimmia alpicola Hedw. On trap rock shore of Rock Harbor, 16262 and 16282. Only var. *rivularis* Brid. has been previously recorded from Isle Royale.

Grimmia apocarpa Hedw. var. *stricta* (Turn.) Mitt. Extensive mat on trap rock shore of Rock Harbor, 16260. Only the typical form of the species has been reported from Isle Royale, although *G. ambigua* and *G. conferta*, also reported, are now commonly treated as additional varieties of the polymorphic *G. apocarpa*.

Mnium punctatum L. var. *elatum* Schimp. Crevice in conglomerate shore of Rock Harbor, 16273. The variety has not been previously reported from the island.

Oreoweisia serrulata (Funck) De Not. On trap rock shore of Rock Harbor, 16280.

Orthotrichum obtusifolium Brid. On trunk of aspen, upper shore of Rock Harbor, 16274 and 16284; on trunk of mountain ash, trail to Scoville Point, 16324.

Orthotrichum sordidum Lesq. & James. On trunk of aspen, shore of Rock Harbor, 16273½.

Pylaisia selwynii Kindb. On trunk of aspen, trail to Scoville Point, 16317.

Rhytidium rugosum (Hedw.) Kindb. In bed of *Empetrum* at edge of rock pool, Scoville Point, 16331.

Sphagnum dusenii C. Jens. In *Chamaedaphne* bog, Raspberry Island, 16300.

Tortella fragilis (Drumm.) Limpr.² Crevices in trap rock shore of Rock Harbor, Scoville Point, 16315.

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²A collection of this species from Alger County (pockets in dry sandstone ledge, Pictured Rocks, 9 miles northeast of Munising, 16091½) evidently represents the first recorded from that county.